

REMARKS

The Office Action of May 15, 2003 has been reviewed and the Examiner's comments carefully considered. The present Amendment amends claims 26, 31, 35, 37, 47 and 48 in accordance with the originally-filed specification and cancels claim 49. Claims 26-48 remain in this application. The Examiner is thanked for indicating that the subject matter of claims 27, 32, 37, 38, 45, 46 and 49 define over the prior art of record. The Examiner is further thanked for allowing claims 45 and 46 in their present form.

Initially we note that the Examiner has objected to the specification, and has specifically objected to the abstract of the disclosure. In particular, the Examiner indicates that the abstract recites "and to a separating vessel designed in accordance with the method of claim 24". Applicant agrees that such language would be inappropriate for the abstract, however, upon review of the presently-pending abstract of the disclosure, no such language can be found. Applicant respectfully submits that, in a Preliminary Amendment, dated December 4, 2001, a new abstract was submitted to the United States Patent and Trademark Office. The non-compliant language identified by the Examiner is not included in this previously-modified abstract. Therefore, the Applicant respectfully requests reconsideration of the Examiner's rejection in this regard. A copy of the Abstract submitted with the December 4, 2001 Preliminary Amendment is enclosed herewith.

Claim 47 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner suggests that the language "a step of applying a device" is improper and should be reworded. In addition, the Examiner provided suggested amendments for proper rewording of this claim. Applicant has fully

adopted the Examiner's suggested modifications to claim 47 and, accordingly, requests withdrawal of this rejection.

The Examiner has rejected claims 26, 28-31, 33, 34-36, 39-44, 47 and 48 over certain prior art references. Specifically, claims 26, 28-31, 33, 34-36 and 39-44 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,590,558 to Fernandes. Further, claims 47 and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the Fernandes patent. Claims 26, 28, 30, 31, 33, 34-36 and 39-44 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 2,936,043 to Armstrong et al. (hereinafter "the Armstrong patent"). Finally, claims 47 and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the Armstrong patent. In view of the above amendments and the following remarks, Applicant respectfully requests reconsideration of these rejections.

Independent claim 26 of the present application, as amended, is directed to an inlet device for separating a mixture of gas with liquids and/or solids. The inlet device is configured for fluid communication with a gravity separation vessel. The inlet device includes an inlet for a supply of the mixture to be separated and a first and second outlet opening for a discharge of, respectively, a first mixture part and a second mixture part into a space of the gravity separation vessel. The inlet device also includes a flow body arranged substantially concentrically in the inlet device and provided with one or more swirl elements for setting the supplied mixture into swirling movement. A discharge channel discharges the first mixture part to the first outlet opening, and the discharge channel is arranged substantially through the interior of the flow body and extends from a downstream side of the flow body to the first outlet opening. The inlet device further includes a first resistance

element with a predetermined flow resistance arranged between the second outlet opening and the flow body and/or a second resistance element with a predetermined flow resistance arranged in the discharge channel downstream of which the first outlet opening is arranged.

Independent claim 45 is directed to a device for separating a mixture of gas with liquids and/or solids. The device includes a gravity separation vessel which is provided with an inlet for a supply of the mixture and a processing vessel. The processing vessel includes an inlet for a supply of the mixture to be separated, a first and second outlet opening for a discharge of, respectively, a first mixture part and a second mixture part into a space of a further vessel, and a flow body arranged substantially concentrically in the processing vessel and provided with one or more swirl elements for setting the supplied mixture into swirling movement. A discharge channel discharges the first mixture part to the first outlet opening, and the discharge channel is arranged substantially through an interior of the flow body and extends from a downstream side of the flow body to the first outlet opening. The processing vessel further includes a first resistance element with a predetermined flow resistance arranged between the second outlet opening and the flow body and/or a second resistance element with a predetermined flow resistance arranged in the discharge channel downstream of which the first outlet opening is arranged. Finally, the processing vessel can be mounted in a gravity separation vessel with the inlet connected to the inlet of the gravity separation vessel, where the first and second outlet openings of the processing vessel are arranged for the discharge of the first mixture part and the second mixture part into a space of the gravity separation vessel for further separation of the second mixture part.

Independent claim 47, as amended, is directed to a method for treating a mixture of gas with liquids and/or solids. The method comprises the step of sending the

mixture into a processing vessel for separating a mixture of gas with liquids and/or solids. The processing vessel includes an inlet for a supply of the mixture to be separated, a first and second outlet opening for a discharge of, respectively, a first mixture part and a second mixture part into a space of a further vessel, and a flow body arranged substantially concentrically in the processing vessel and provided with one or more swirl elements for setting the supplied mixture into swirling movement. A discharge channel discharges the first mixture part to the first outlet opening and is arranged substantially through an interior of the flow body and extends from a downstream side of the flow body to the first outlet opening. The processing vessel also includes a first resistance element with a predetermined flow resistance arranged between the second outlet opening and the flow body and/or a second resistance element with a predetermined flow resistance arranged in the discharge channel downstream of which the first outlet opening is arranged. A gravity separation vessel is also included, and this vessel is provided with an inlet for a supply of the mixture. The processing vessel can be mounted in the gravity separation vessel with the inlet connected to the inlet of the gravity separation vessel, where the first and second outlet openings of the processing vessel are arranged for the discharge of the first mixture part and the second mixture part into a space of the gravity separation vessel for further separation of the second mixture part.

The Fernandes patent is directed to a particle-from-fluid separator. As best seen in Fig. 1, the device of the Fernandes patent can be used for separating gases from solids and includes an inlet 14 and a first outlet 28 and a second outlet 89 for discharging various mixture parts. The device also includes a separator tube 24 (acting as the flow body) and having multiple flow elements, referred to as vanes 44, to impart rotational flow to the gases

entering the separator tube interior. The gas discharge tube 28 is located below the upper end of the separator tube 24, and a first resistance element 54, referred to as a flow reversing head, is positioned within the separator tube 24 intermediate the upper and lower ends, such that the fluid flowing along the peripheral vortex flow path 98 would be acted upon by the reversing head 54 to smoothly direct the spinning fluid inwardly and upwardly. Still further, straightening vanes 36 are positioned in the discharge tube 28 adjacent the inlet end 30 for transforming the flow pattern of the gases entering the tube from rotational to linear flow.

The Armstrong patent is directed to a cyclonic dust collector and discloses a device that can separate gas from solids. An arcuate inlet vane assembly 14 is positioned at the inlet end of the collector tube 10 and the outlet tube 13. A tapered dust outlet 11 is positioned at the bottom end of the collector tube. Radially disposed vane 16 produces high tangential gas velocities in the annular separating chamber between the collector tube and the outlet tube. In addition, multiple helically-shaped vane 17, equally spaced around the axis of the outlet tube 13, reduce entry losses of the gases entering the outlet tube in the lower portion of the separator tube. This makes it possible to effect a substantial shortening of the separator tube.

The Examiner has allowed independent claim 45. Therefore, dependent claim 46, which depends from independent claim 45, is likewise allowed. Still further, the Examiner has indicated that the subject matter of dependent claim 49 distinguishes over the prior art of record. The limitations of dependent claim 49 have been added to independent claim 47, and claim 49 has been cancelled. Accordingly, and since the Examiner's Section 112, second paragraph, rejections of independent claim 47 have been overcome, amended independent claim 47 is in condition for allowance. Applicant further notes that all of claims

45, 46 and 49 have been allowed and/or define over the prior art of record since they recite that the processing vessel can be mounted in a gravity separation vessel, which is provided with an inlet for the mixture. In any case, all of claims 45, 46 and 47 are believed to be allowable for these reasons.

The present invention is directed to a processing vessel, however, in particular, the present invention is directed to a pretreatment inlet device for installation in a larger gravity separation vessel. The inlet device is connected to the inlet of the gravity separation vessel, with two outlets of the inlet device discharging into the interior of the gravity separation vessel. Due to the special design of the second resistance element in the discharge flow of the first mixture (gas) and/or a design of the first resistance element in the discharge flow of the second mixture (liquid), a predetermined pressure balance in the inlet device can be attained. Therefore, the location of the gas-liquid interface or surface can be adjusted. See specification, page 13, lines 5-23. As a result, the gas-liquid interface can be situated at a suitable level in the processing vessel. See specification, page 2, first paragraph. In operation, the location of the gas/liquid interface must lie between the downstream end of the flow body and upstream of the resistance element arranged between the flow body and the second outlet opening. This required position prevents the affects of "gas blowby" and "gas-carry under." See specification, page 12, line 38 and page 13, line 33.

The location of the gas/liquid interface is determined by the provision of suitable resistance means situated in either the liquid discharge, i.e., between the flow body and the second outlet, or the gas discharge, i.e., in the discharge channel downstream of which the first outlet opening is situated. Further, a combination of resistance means in the

liquid discharge and resistance means in the gas discharge would assist in attaining a suitable level of the gas/liquid interface in the device.

The present invention differs from the cited prior art in several key aspects. As discussed above, the use of the first resistance element and/or the second resistance element provides the adjustable gas/liquid level or interface. Further, the resistance means allow for a predetermined pressure balance in the inlet device. This, in turn, allows for an adjustable gas/liquid interface, which, as discussed, prevents the situation where gas flows out of the liquid outlet and/or liquid out of the gas outlet. This structure also ensures that the discharge of gas is not obstructed by an increase in the quantity of liquid in the inlet device. The device of the Armstrong patent, while including vanes 16 (as swirl elements) and vane 17 (as a resistant element), operates in a different manner than the device and system of the present invention. Still further, only one resistance element is disclosed, namely vane 17, which operates to act on the tangential velocity patterns in the lower portion of the separator tube. In addition, the purpose of the resistance element 17 of the device in the Armstrong patent is to allow for a shortening of the separator tube.

In another key aspect, the processing vessel or device of the present invention is an inlet device. In addition, this inlet device is specifically for use in connection with a gravity separation vessel. Therefore, the inlet device is configured for fluid communication with a gravity separation vessel, such that the first and second outlet openings discharge a first mixture part and second mixture part into a space of the gravity separation vessel. The Fernandes patent is directed to a particle-from-fluid separator. The Armstrong patent is directed to a cyclonic dust collector. Neither the device of the Fernandes patent nor the device of the Armstrong patent are inlet devices for separating a mixture of gas with liquid

and/or solids. The device of the Fernandes patent and the device of the Armstrong patent also do not provide the adjustable gas/liquid interface resulting from a predetermined pressure balance. Still further, the Examiner has indicated that the disclosure of a processing vessel (the inlet device) that can be mounted or placed in fluid communication with the gravity separation vessel is a novel limitation. Accordingly, both independent claim 26 and independent claim 48 have been appropriately modified to reflect this novel limitation.

For the foregoing reasons, and as indicated by the Examiner, independent claim 26 of the present application, as amended, is not anticipated by or rendered obvious over the Fernandes patent and/or the Armstrong patent. Neither the Fernandes patent nor the Armstrong patent teach or suggest an inlet device for separating a mixture of gas with liquids and/or solids, where the inlet device is configured for fluid communication with a gravity separation vessel and includes a first and second outlet opening for a discharge of respectively a first mixture part and a second mixture part into a space of the gravity separation vessel, as specifically set forth in independent claim 26. There is no hint or suggestion in any of the references cited by the Examiner to combine these references in a manner which would render the invention, as claimed, obvious. Reconsideration of the rejection of independent claim 26 is respectfully requested.

Claims 27-44 depend either directly or indirectly from and add further limitations to independent claim 26 and are believed to be allowable for the reasons discussed hereinabove in connection with independent claim 26. Further, the Examiner has indicated that the limitations found in claims 27, 32, 37 and 38 already define over the prior art of record. Therefore, for all the above reasons, reconsideration of the rejections of claims 28-31, 33-36 and 39-44 is respectfully requested.

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Still further, and for the foregoing reasons and for the reasons indicated by the Examiner, independent claim 48 of the present application, as amended, is not anticipated by or rendered obvious over the Fernandes patent and/or the Armstrong patent. Specifically, neither the Fernandes patent nor the Armstrong patent teach or suggest a method for designing a device, including designing components of an inlet device, where the inlet device includes a first and second outlet in fluid communication with a gravity separation vessel, as specifically set forth in independent claim 48. There is no hint or suggestion in any of the references cited by the Examiner to combine these references in a manner which would render the invention, as claimed, obvious. Reconsideration of the rejection of independent claim 48 is respectfully requested.

For all the foregoing reasons, Applicant believes that claims 26-48, as amended, are patentable over the cited prior art and in condition for allowance. Reconsideration of the rejections and allowance of all pending claims 26-48 are respectfully requested.

Respectfully submitted,

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